Robert,

It was clear from the public hearing that the commonwealth is relying upon the manomet studies conclusion that wood fired electric power generation produces more CO2 than coal fired electric power generation.

You will see from the following analysis that this conclusion is incorrect chemically. Below please find the chemical analysis of both wood and coal together with the calculation of CO2 produced per kWh of electricity generated using each fuel type. Coal produces more CO2 per kWh generated than does wood. This is true even though the manomet study employs the wrong assumption about wood electricity generation, namely that whole logs are employed rather than waste wood(/tops).

| Power | Bituminous Coal | Wood |
|---|---|---|
| Combustion Efficiency | 30% | 28% (wet wood) |
| Energy Density | 6.67 kWh/kg | 2.58 kWh/kg |
| Actual Energy Density | 2 kWh/kg | 1.548 kWh/kg |
| CO2 Emissions | 1.47 kg/kWh | 1.22 kg/kWh |
| Carbon Content | 80% | 52% |

Combustion Equation:

The molecular weight of Carbon is 12 while the molecular weight of Oxygen is 16. For every kg of wood used as fuel .52 kg of carbon goes in, this results in 1.9 kg of CO2 using the combustion equation above. For every kg of coal used 0.8 kg of carbon goes in, this results in 2.93 kg of CO2 produced per kg of coal used for fuel. This will be called the resulting CO2 per kg fuel.

In order to figure out the carbon emissions per kWh, first the energy density must be multiplied by the combustion efficiency to find the actual energy output for wood and coal (shown above in the table). Dividing the resulting CO2 per kg fuel by the actual energy density yields the CO2 emissions per kWh of 1.47 kg/kWh for Coal and 1.22 kg/kWh for wood.

This shows that the actual CO2 generated from wood is less not more than the amount of CO2 generated from coal when one adds that fact that the wood used for electric power generation would otherwise be left in the forest to decompose the advantages of wood become even more significant.

Richard Rosen